## CLAIMS

What is claimed is:

1. A method of stateless group communication and repair of data packets to nodes in a distribution tree, said method comprising:

encoding said distribution tree to produce an encoded distribution tree;

creating a header including said encoded distribution tree;

adding said header to a data packet to be distributed to said distribution tree; and

modifying said header as said data packet is distributed down said distribution tree to repair said distribution tree.

2. The method in claim 1, wherein said repair comprises forwarding said data packet to a node to which a failed node would have forwarded said data packet.

3. The method in claim 1, further comprising modifying said header as said data packet is distributed down said distribution tree to remove encoded information concerning upper distribution levels of said distribution tree.

4. The method in claim 1, wherein said repair comprises decoding a portion of said encoded distribution tree as a node receives said data packet and re-encoding said encoded distribution tree as said node passes said data packet to another node down said distribution tree.

5. The method in claim 1, wherein said distribution tree controls the order in which said nodes receive said data packets.

6. The method in claim 5, wherein by controlling the order in which said nodes receive said data packets, said encoded distribution tree permits said nodes to process said data packets upon receipt.

7. The method in claim 1, further comprising, prior to said encoding process, creating said distribution tree at a sender node based upon a dynamic group of receiver nodes.

8. The method in claim 1, wherein said encoding comprises sequentially entering addresses of nodes during a per-level traversal of said distribution tree starting from the root of said distribution tree.

9. A method of stateless group communication of data packets to nodes in a distribution tree, said method comprising:

encoding said distribution tree to produce an encoded distribution tree;

creating a header including said encoded distribution tree;

adding said header to a data packet to be distributed to said distribution tree;

detecting failed nodes down said distribution tree;

modifying said header as said data packet is distributed down said distribution tree to skip said failed node and remove said failed node from said encoded distribution tree.

10. The method in claim 9, wherein said modifying forwards said data packet to a node to which said failed node would have forwarded said data packet.

11. The method in claim 9, wherein said modifying comprises modifying said header as said data packet is distributed down said distribution tree to remove encoded information concerning upper distribution levels of said distribution tree.

12. The method in claim 9, wherein said modifying comprises decoding a portion of said encoded distribution tree as a node receives said data packet and re-encoding said encoded distribution tree as said node passes said data packet to another node down said distribution tree.

13. The method in claim 9, wherein said distribution tree controls the order in which said nodes receive said data packets.

14. The method in claim 13, wherein by controlling the order in which said nodes receive said data packets, said encoded distribution tree permits said nodes to process said data packets upon receipt.

15. The method in claim 9, further comprising, prior to said encoding process, creating said distribution tree at a sender node based upon a dynamic group of receiver nodes.

16. The method in claim 9, wherein said encoding comprises sequentially entering addresses of nodes during a per-level traversal of said distribution tree starting from the root of said distribution tree.

17. A method of stateless group communication of data packets to nodes in a distribution tree, said method comprising:

encoding said distribution tree to produce an encoded distribution tree;

creating a header including said encoded distribution tree;

adding said header to a data packet to be distributed to said distribution tree;

detecting failed nodes down said distribution tree;

modifying said header as said data packet is distributed down said distribution tree to pass said data packet around said failed node.

18. The method in claim 17, wherein said modifying forwards said data packet to a node to which said failed node would have forwarded said data packet.

19. The method in claim 17, wherein said modifying comprises said header as said data packet is distributed down said distribution tree to remove encoded information concerning upper distribution levels of said distribution tree.

20. The method in claim 17, wherein said modifying comprises decoding a portion of said encoded distribution tree as a node receives said data packet and re-encoding said encoded distribution tree as said node passes said data packet to another node down said distribution tree.

21. The method in claim 17, wherein said distribution tree controls the order in which said nodes receive said data packets.

22. The method in claim 21, wherein by controlling the order in which said nodes receive said data packets, said encoded distribution tree permits said nodes to process said data packets upon receipt.

23. The method in claim 17, further comprising, prior to said encoding process, creating said distribution tree at a sender node based upon a dynamic group of receiver nodes.

24. The method in claim 17, wherein said encoding comprises sequentially entering addresses of nodes during a per-level traversal of said distribution tree starting from the root of said distribution tree.

25. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform a method of extracting circuit characteristics from a circuit design, said method comprises establishing transmission headers for stateless group communication of data packets to nodes in a distribution tree, said method comprising:

encoding said distribution tree to produce an encoded distribution tree;

creating a header including said encoded distribution tree;

adding said header to a data packet to be distributed to said distribution tree;

detecting failed nodes down said distribution tree;

modifying said header as said data packet is distributed down said distribution tree to skip said failed node and remove said failed node from said encoded distribution tree.

26. The program storage device in claim 25, wherein said modifying forwards said data packet to a node to which said failed node would have forwarded said data packet.

27. The program storage device in claim 25, wherein said modifying comprises modifying said header as said data packet is distributed down said distribution tree to remove encoded information concerning upper distribution levels of said distribution tree.

28. The program storage device in claim 25, wherein said modifying comprises decoding a portion of said encoded distribution tree as a node receives said data packet and re-encoding said encoded distribution tree as said node passes said data packet to another node down said distribution tree.

29. The program storage device in claim 25, wherein said distribution tree controls the order in which said nodes receive said data packets.

30. The program storage device in claim 29, wherein by controlling the order in which said nodes receive said data packets, said encoded distribution tree permits said nodes to process said data packets upon receipt.

31. The program storage device in claim 25, further comprising, prior to said encoding process, creating said distribution tree at a sender node based upon a dynamic group of receiver nodes.

32. The program storage device in claim 25, wherein said encoding comprises sequentially entering addresses of nodes during a per-level traversal of said distribution tree starting from the root of said distribution tree.